

REMARKS/ARGUMENTS

Claims 1-30 are pending in the application and a were rejected by the Examiner. Applicant, by this paper, amends claims 1, 13, 17, 21, 28, 29 and 30 and requests reconsideration and allowance of all pending claims.

Discussion of Objections to the Disclosure

The Examiner objects to the terms “scalar bias value,” “bias value,” “bias module,” “store loading,” and “maximum weight” appearing in claims 6, 13, 16, 19, and 27. The Examiner requests the Applicant amend the Specification and Drawings to describe the claimed subject matter.

Applicant amends the Specification or the claims to ensure that the terms are described in the Specification. For example, the terms “bias module,” “bias value,” and “scalar bias value” are described in the Specification, at page 8, paragraph [0044].

Applicant amends claim 13 to change the term “store loadings” to align with the term --store loads-- appearing in the Specification at page 14, paragraph [0074].

Applicant amends the Specification at page 11, paragraph [0057] to explicitly include the term “maximum weight.” It is clear from the original Specification that the paragraph discusses a range of allowable weights and gives an example of a maximum weight.

No new matter is added with the amendments. Applicant respectfully request withdrawal of the objections in light of the amendments to the Specification and claim.

Discussion of Rejections Under 35 U.S.C. §102

Claims 1, 2, 5, 14, 15, 21, 22, 28, 29, and 30 were rejected under 35 U.S.C. §102(b) as allegedly anticipated by “*Adaptive nonlinear neural network controller for rotorcraft vibration*” by Spencer et al., 1997, SPIE Vol 3-041, 538-553, (hereinafter Spencer). Claims 17-20 were rejected under 35 U.S.C. §102(b) as allegedly anticipated by the PhD dissertation “Aeroelasticity of morphing wings using neural networks” to Natarajan, 2002, (hereinafter Natarajan).

In order for a claim to be anticipated by a reference, the single prior art reference must describe, either expressly or inherently, each and every element as set forth in the claim. Applicant contends that the cited references fail to describe at least one element as set forth in the claims.

Claim 1 is amended to include the feature that “the one or more input parameters relating to a repair of the structure.” Support for the amendment is found throughout Applicant’s Specification. *See, for example, Applicant’s Specification*, at paragraph [0057]. Claim 1 also includes a neural network transformation that is “based in part on a trained neural network.” These features are not described in Spencer.

Spencer is not even directed to aeroelastic analysis and, instead, is directed to a control system to control the vibration of rotor blades. *See, Spencer*, Abstract. Spencer fails to describe any aeroelastic analysis, because Spencer is directed to vibration control of a mechanical structure.

The Examiner argues that Spencer describes aeroelastic analysis of a structure and cites to Spencer, at page 539, ll. 8-18. However, the cited portion of Spencer states: “...a neural network is used in real time to adaptively approximate unknown periodic disturbance forces acting on the rotor blade due primarily to the aerodynamic forces.” *Spencer*, at page 539, ll. 16-18. Spencer expressly states that the neural network is used as part of a control method used to control rotor blades. *Id.*, at ll. 8-10. Spencer notes that aerodynamic forces contribute to the periodic disturbances acting on a rotor blade, but fails to describe aeroelastic analysis.

Furthermore, Spencer expressly states: “The use of neural networks in the controller presented below, however, is different because off-line *training is not performed*.” *Id.*, at ll. 14-15. Thus, Spencer expressly states that training is not performed.

Therefore, because Spencer fails to describe aeroelastic analysis, fails to describe a repair to a structure, and fails to describe a trained neural network, Spencer fails to describe every claimed feature in the manner set forth in claim 1.

Claim 14 includes: “a neural network module coupled to the input module and configured to provide the weight and location as inputs to a trained neural network having at

least two neurons to determine a flutter speed and an associated flutter frequency based in part on the weight and location.” Spencer fails to describe at least this claimed feature.

Spencer fails to describe a neural network having at least two neurons, and fails to describe providing a weight and location to such a neural network. The Examiner fails to identify any portion of Spencer describing the claimed feature.

Additionally, Spencer fails to describe flutter a speed and associated flutter frequency. The Examiner contends that the rotational speed described in Spencer corresponds to the claimed flutter speed. However, careful examination of Spencer reveals that this cannot be the case. Spencer describes a rotational speed, but states: “The rotation of the hub is assumed to be at a constant speed, Ω .” *Spencer*, at page 539, last paragraph. Thus, the analysis performed in Spencer clearly does not determine a rotational speed because the rotational speed is assumed to be constant.

Furthermore, the Examiner fails to provide any explanation as to how the rotational speed is related to a flutter speed, which Applicant describes in the Specification in association with Figure 3. The flutter speed is a characteristic of the structure being analyzed, while the rotational speed described in Spencer is the speed at which the rotor blades are subjected. Spencer does not equate the two and fails to include any description of flutter speed.

Therefore, claim 14 is believed to be allowable over Spencer, because Spencer fails to describe every claimed feature.

Claim 17 includes a feature of “determining input parameters relating to one or more repairs performed on a structure.” Similarly, **claim 21** includes “receiving at least one input parameter related to a repair of an aircraft structure,” **claim 28** includes “receiving at least one input parameter related to a repair of an aircraft structure,” **claim 29** includes “receiving a mass input related to a repair,” and **claim 30** includes “means for receiving input parameters relating to a repair of an aircraft structure.”

Spencer fails to describe these features as discussed above in relation to claim 1. Additionally, Natarajan fails to describe any repairs on aircraft structures or the use of a neural network to perform aeroelastic analysis of a repaired structure. Therefore, claims 17, 21, 28, and

30 are believed to be allowable at least for the reason that the references fail to describe every claimed feature.

Applicant respectfully request reconsideration, withdrawal of the rejections to claims 1, 14, 17, 21, 28, and 30.

Discussion of Rejections Under 35 U.S.C. §103

Claims 3-4 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Spencer in view of U.S. Patent Publication No. 20030191406 to Eberhart et al. (hereinafter Eberhart). Claims 6-10, 13, 16, 23, 25, 27, and 29 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Spencer in view of Natarajan. Claims 11 and 24 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Spencer in view of U.S. Patent No. 5,784,739 to Kawada et al. (hereinafter Kawada). Claims 12 and 26 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Spencer in view of U.S. Patent No. 6,189,830 to Schnelz et al. (hereinafter Schnelz).

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be reasonable expectation of success. Finally, the prior art reference, or references when combined, must teach or suggest all of the claim limitations.

The cited references, whether alone or in combination, fail to teach or suggest every claimed feature. Moreover, there is no motivation to combine or modify the reference teachings in a manner that would lead one of ordinary skill in the art to the claimed invention.

As described above, claim 29 includes “receiving a mass input related to a repair.” Neither Spencer nor Natarajan teaches or suggests the claimed feature. The combination of the two references does not teach or suggest the features absent from each reference individually. Therefore, claim 29 is believed to be allowable over Spencer in view of Natarajan, because the combination of references fail to teach or suggest every claimed feature.

Furthermore, there is not motivation to combine the references in the manner suggested by the Examiner. The prior art must suggest the desirability of the claimed invention. *See, generally, MPEP 2143.01.* The teaching or suggestion to suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The mere fact that references *can* be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). It is error to reconstruct the claimed invention from the prior art by using the claim as a "blueprint." When prior art references require selective combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight obtained from the invention itself. *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 227 USPQ 543 (Fed. Cir. 1985).

The prior art fails to provide any reason for combination, and the Examiner fails to provide any motivation to combine that has the level of specificity needed to make the selective combination argued by the Examiner.

For example, Spencer is directed to a neural network for controlling rotorcraft vibration and Natarajan is directed to aeroelasticity of morphing wings. The Examiner provides only general motivations to combine, such as "For the purpose of highlighting the basic components of a neural network." or "For the purpose of taking advantage of a neural network property of handling non-linear problems with exceptional results." *See, Office Action*, at page 11. However, the Examiner fails to relate how the general motivations argued motivate one to make the very specific modifications argued.

There is nothing in the general motivations argued by the Examiner that would motivate one of ordinary skill in the art to combine a rotorcraft controller with the teachings of a PhD dissertation in aeroelasticity of morphing wings. Moreover, the Examiner does not argue a combination of the general principles, but rather, a specific combination of elements extracted from the Natarajan reference for use in the Spencer reference. The argued motivations provide no support for the selective combination.

Additionally, there is no motivation to combine the teachings of Kawada, Eberhart, or Schnelz with either Spencer or Natarajan. Schnelz is directed to a engine mount for a jet aircraft. The Examiner fails to provide any plausible motivation that would lead one interested in aeroelastic analysis using neural networks to look at a reference directed to an aircraft engine mount.

Eberhart is directed to a method of diagnosing *neurological disorders*. The Examiner fails to provide any plausible motivation that links neurological disorders to aeroelastic analysis using neural networks. Similarly, Kawada is directed to a super-long suspension bridge, and the Examiner fails to provide any plausible motivation that links neurological disorders to aeroelastic analysis using neural networks. For each of the combinations, the Examiner sets forth a very general motivation but fails to describe how the general motivation leads one to the specific modification or combination argued in the rejection.

Applicant respectfully requests reconsideration and withdrawal of all rejections under 35 U.S.C. §103(a) because the Examiner fails to provide any plausible motivation to combine the reference teachings in the specific manner argued in the rejections.

Discussion of Dependent Claims

Claims 2-13, 15-16, 18-20, and 22-27 depend from one of claims 1, 14, 17, or 21 and are believed to be allowable at least for the reason that they depend from an allowable base claim. Applicant respectfully requests reconsideration and allowance of claims 2-13, 15-16, 18-20, and 22-27.

Each of the dependent claims may have individual bases for patentability beyond those discussed above in relation to the independent claims. It is not necessary to discuss the patentable distinctions of each dependent claim because of the allowability of the base claims from which they depend.

However, as noted above, there is no motivation to combine any of the references together in a manner that would lead one of ordinary skill in the art to the claimed invention. Thus, the lack of any motivation to combine the cited references is an independent reason for allowance of many of the dependent claims.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 858-350-6100.

Respectfully submitted,



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